Efficiency and Safety of Radioactive Iodine I-131 in Treatment of Thyroid Disease

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SUMMARY
Thyroid gland is the largest endocrine gland in the body. The thyroid gland produces hormones that regulate the metabolism rate, affect the growth and many functions of various organ systems. Nuclear medicine technique is very useful diagnostic tool in detecting thyroid disease. Thyroid scintigraphy can reveal functional and anatomic information of thyroid gland. A variety of radiopharmaceuticals and methodologies have been used over the years in nuclear medicine. Iodine-131 has been used to image the thyroid several decades. Radioactive Iodine I-131 is useful for the treatment of hyperthyroidism and thyroid cancer. There were 100 participants included in the study who were treated with I-131. The participants were checked 6 months and 12 months after the beginning of the treatment. The results show normalization of the laboratory parameters and hormonal status at the control examinations after 6 months and 12 months therapy with I-131. The side effects did not appear in any of the patients, which demonstrates safe application.

Keywords: thyroid gland, nuclear medicine, thyroid disease, therapy I-131, efficiency, certainty

1. INTRODUCTION
Thyroid disease belongs in the group of endocrinological diseases, or glands with internal secretion (1,2,3,4,5). Over the hormone produced thyroid gland influence on almost all metabolic processes in the body. Usually thyroid problems include irregular hormone production by the thyroid gland. Hormones actions can be divided into three basic functions: growth, maintenance of homeostasis of the body and reproduction (6,7,8). Given the incidence of thyroid diseases they have wide consequences on the population. Thyroid gland is a butterfly shaped gland located in the middle of the neck, with both sides. Thyroid gland consists of two lobes, tied in the middle with isthmus. In healthy adults, the weight or volume of each in isthmus lobe together should not exceed 15-25 grams in adults. According to the level where the disorder occurred disorders of thyroid gland could be: primary-damaged thyroid gland, secondary disturbance is at the level of adenohypophysis and tertiary disorder is at the hypothalamus level. Thyroid diseases can be divided according to morphological criteria in the tumor and non-tumor-benign, and according to the functional state of the gland it may be: euthyroid (normal function), hyperthyroid (increased function) and hypothyroid (reduced thyroid function). Thyroid cancers can be: papillary, follicular, medullar and anaplastic (9,10,11).

2. NUCLEAR MEDICINE
Today, the nuclear medicine is clinically complete field. For the diagnosis of thyroid gland state performed are laboratory analysis in-vitro, and then scintigraphy analysis, and ultrasound of the thyroid gland. In the diagnosis is still irreplaceable and still present the combination of numerous in vivo and in vitro methods, using radioactive isotopes for diagnostic and therapeutic purposes.

By measuring the radioactivity of individual points at the thyroid gland in one moment and at the same time presenting all points of radioactivity in the form of images is called scintigram or scan. Thyroid scintigraphy is an important and common procedure in nuclear medicine. Thyroid scintigraphy is multifunctional visualization of the thyroid gland after administration of the diagnostic dose of different radioactive isotopes. Ultrasound of the thyroid gland is also used as a guide for focused puncture of the thyroid gland (FNA). To set the correct diagnosis of the patient also can be used computerized tomography (CT) and magnetic resonance imaging (MRI).


Radioactive isotopes that are commonly used for diagnostic purposes for scintigraphy are: Tc-99m, 123I, 131I, 201 TI. Machines for visualization in scintigraphy are scanner or gamma camera with the appropriate collimator.

Thyroid diseases can be treated: with medications for hyper or hypothyroidism, with iodine tablets, administration of radioactive iodine I-131, with surgical treatment of thyroid gland, broad-spectrum antibiotics are commonly given for acute inflammation of the thyroid gland, radiation and chemotherapy.

Treatment with radioactive iodine in addition to surgery and treatment thyrostatics is one of the radical forms of treatment in case of Based disease, in case of thyroid gland autonomy and the cancer. For the treatment is used radioactive iodine I-131 and I-125. Both isotopes are gamma and beta emitters.

3. GOAL
To determine the therapeutic effect of radioactive iodine-I-131 in the treatment of thyroid gland diseases.

4. MATERIALS AND METHODOLOGY
The study is retrospective and it included 100 patients treated with radioactive iodine I-131. The study included all patients with benign thyroid diseases for which treatment is indicated and the treatment with radioactive iodine I-131 is administered.

All patients are normally treated at the Clinic for Nuclear Medicine, Clinical Center of Sarajevo University. Parameters that are monitored are: age, sex, hormonal status of patients before treatment, 6 months after the therapy, 12 months after therapy and thyroid scintigraphy after the treatment.

5. RESULTS
Shown in tables and figures (Table 1 and Figures 1 to 11).

6. DISCUSSION AND CONCLUSIONS
The study was conducted at the Clinic of Nuclear Medicine, Clinical Center of Sarajevo University. The study included 100 patients, of whom 96 (96%) were female patients and 4 (4%) male. All patients...
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Determined is the therapeutic effect of radioactive iodine I-131 use in the treatment of thyroid diseases. Efficiency is defined in terms of regulation of hormonal status: TSH, FT4 and FT3, after 6 and after 12 months of using radioactive iodine I-131 in the treatment of thyroid diseases. The largest number of respondents was in the age group 55-75 years or 43 (43%), while 36 (36%) of respondents were in the age group 35-55 years. Thyroid disease in younger patients 20 to 35 years of age was present in 21 cases.

Out of all the most common thyroid disease is hyperthyroidism in 54 (54%) cases, while unifocal autonomy is reported by 18 (18%) patients and in 28 patients hyperthyreosis. Hypothyreosis occurred in 10 cases at age 20-35 years, and in 8 patients in groups between 35-55 and 55-75 years of age, and the least in the age group over 75 years. Thyroid disease was present in 36 cases in the age group 35-55 years, and in the age group 55-75 years in 43 patients. Unifocal autonomy is most common in the 9 case in people aged 55-75 years of life, and in 6 patients in group 35-55 years. Therapy with radioactive iodine I-131 in the treatment of thyroid diseases has proved to be effective, without adverse effects.